

Classification Cancelled

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8 August 1958

K-114
L-15082

Date

MAR 24 1972

NRO Review Completed.

National Academy of Sciences
Post Office Box 131
Woods Hole, Massachusetts

Attention: Dr. Courtland Perkins

Dear Dr. Perkins:

Bob Buchheim has asked me to send you a brief statement on reconnaissance satellites. Because this is one of my favorite subjects, I have had great difficulty in keeping it brief. It is my understanding that you have RAND S-72, hence my reference to it.

Other sensors besides photography (or TV) are possible. Except for their possible role in the warning problem, which I regard as closer to MORAD than to Intelligence, the major sensor will be photography (or TV), for reasons developed in Lecture 26 of S-72. The prepared statement follows:

Military reconnaissance satellites may be categorized in several ways -- by useful life, purpose, sensor, method of returning data, etc.* One such abbreviated outline is attached. A useful concept of reconnaissance operations envisions wholesale and cyclic coverage of many millions of square miles at a relatively poor ground resolution (e.g. 50' - 100') with concurrent selective and cyclic coverage of smaller areas at increasingly good ground resolution, and simultaneous and continuous surveillance of selected areas on a very frequent basis. This concept permits and in fact requires the development and use of satellites which rapidly collect and physically return such large volumes of data as would be impossible to send back by video link. This type of satellite could be of relatively short life, and operate at relatively low altitude (e.g. 150-200 miles). The surveillance satellites could and should allocate and expend their low information rate video link potential on those reconnaissance targets and tasks which require daily (or more frequent) surveillance.

*See RAND S-72 - Lecture 26

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Dr. Courtland Perkins

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A simple example will quantify the data rate problem. Two hours of 6 mcs/sec communication link is roughly the equivalent of 30 feet of 70 mm. wide film at a resolution of 100 lines/mm. One can easily envision and design systems which recover in one day more than one hundred times this amount of data.

A sensible mixture of satellites -- and of programs to obtain these satellites -- would emphasize the potential surveillance capability of the long-lived satellite which transmits its data by video link, and minimize the role of this type of satellite in the collection of huge quantities of data. The latter task is better suited for those satellites from which data is recovered physically. These systems, doing different jobs, are not competitive, but complementary.

Sincerely yours,

A. H. Katz
Engineering DivisionARK:hav
Attach.

*See RAND S-72 - Lecture 26

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PURPOSE	PREFERRED CAMERA/TYPE	TYPICAL ORBIT ALT.	LIFE	DATA RETURN VIDEO	PHYSICAL R/COV.	POSSIBLE GROUND RESOLUTION
Large Area Search	Panoramic Camera, or Strip Camera or Frame Camera	150 miles	Short	X		Depending on particular type from 50 to 500
Continuous Surveillance of Selected Targets	TV or Photo, Strip Camera	300 miles	Long	X		200
Mapping, I.C. TIE; Geodetic Data	Hard Format, Between lens shutter	1000 miles	Short	X		Ground Res. of 60 feet possible with 17 ft. resolution

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15 May 72

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